HYPERSPECTRAL *IN SITU* SUPPORT FOR PACE (HYPERINSPACE)

Autonomous above-water radiometry

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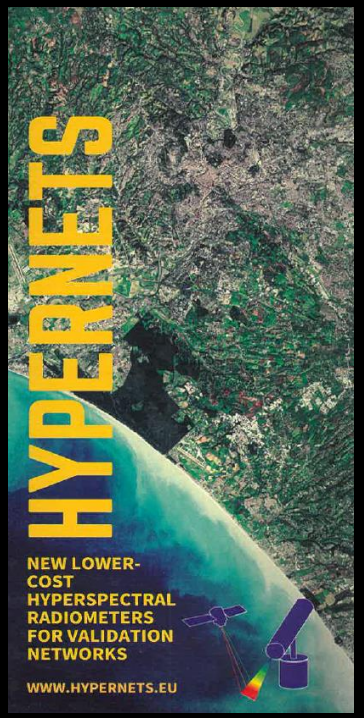
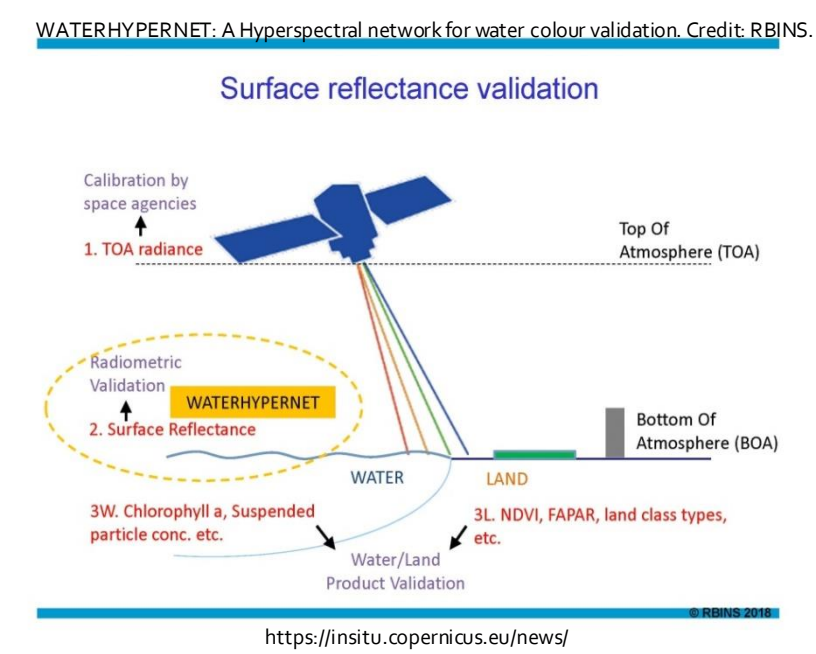
GESTAR

Quality Data for Cal/Val and Algorithm Development



- Satellite OC imagery, without *in situ* validation = fridge magnets and mouse pads
- AeronetOC-like hyperspectral towers may help
  - Finite & fixed (none planned for US yet)
  - Not yet built
- Autonomous Above-Water Data
  - Ferries, RVs since ~2003
  - Often matched to in-water AOPs/IOPs
  - All conditions and water-types
  - Is it "quality" data?
  - How was it processed?



https://insitu.copernicus.eu/news/

Challenges

Recent NASA Affiliated Cruises with HyperSAS:

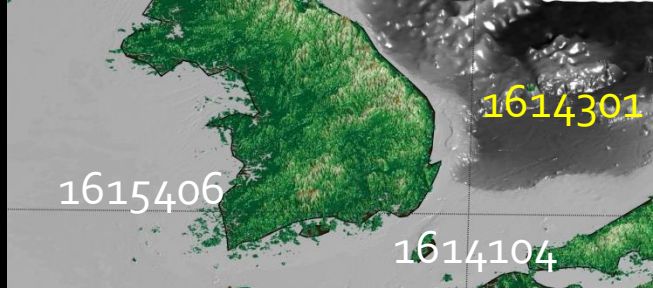
- NOAA NESDIS STAR/JPSS/VIIRS - CZCS to present
  - Nov 2014; MAB (Hyperpro, HTSRB, HyperSAS, etc.)
- ECOA
  - June-July 2015; US E. Coast
  - RV Gordon Gunter
- NOAA VIIRS JPSS 2015
  - Dec 2015; MAB, Bahamas
- KORUS
  - May 2016; Korea, East Sea
  - RV Onnuri
- Cyanate
  - Aug 2016; MAB
  - RV Sharp
- Sea-to-Space
  - Jan Feb 2017; E. Pacific
  - RV Falkor
- P06S
  - July-Sept 2017; Trans-Pacific
  - RV Nathaniel Palmer
- EXPORTS
  - Sept 2018; N.E. Pacific
  - RV Sally Ride
- EXPORTS
  - May 2019; N.E. Atlantic
  - RV Discovery

Thousands of hours/miles of automated collections & counting

Dirk Aurin; OS2020 San Diego


Terminal Shell Edit View Window Help
100% Sat Feb 15 4:29 PM
HyperInSPACE — -bash — 89×57
(base) GSSLA18091785:HyperInSPACE daurin$ python Main.py

Preliminary Findings
KORUS 2016 $R_{rs}(\lambda, t)$



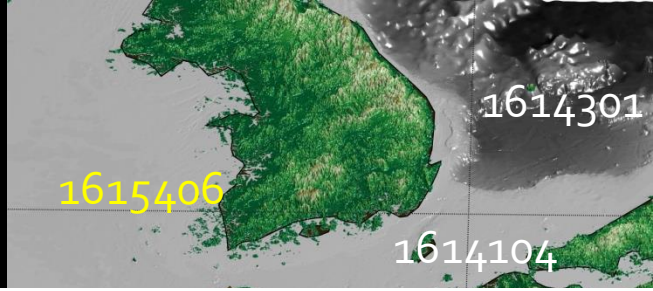
130° E

35° N

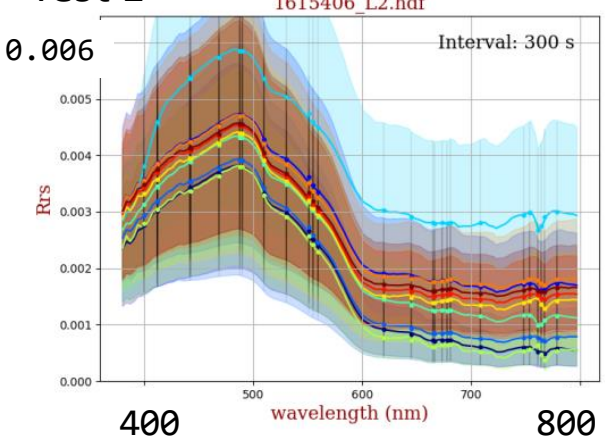
SOUTH
KOREA

Busan

Underway Data
5 Minute Ensembles



Test 1



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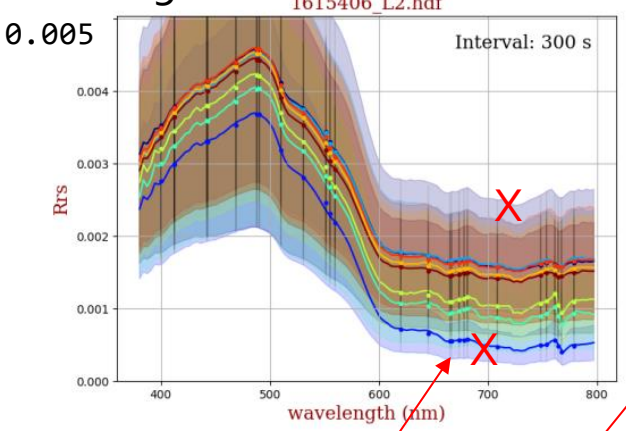
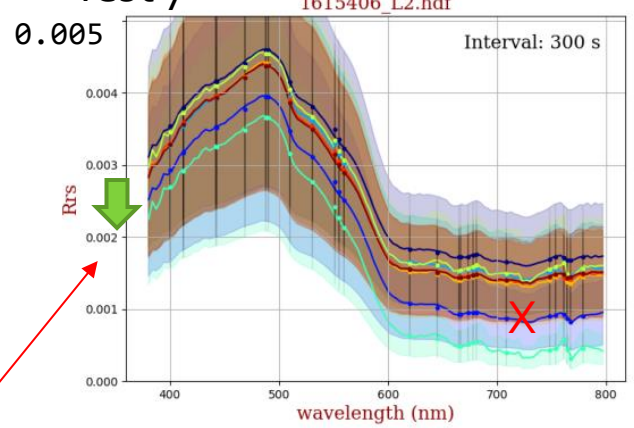
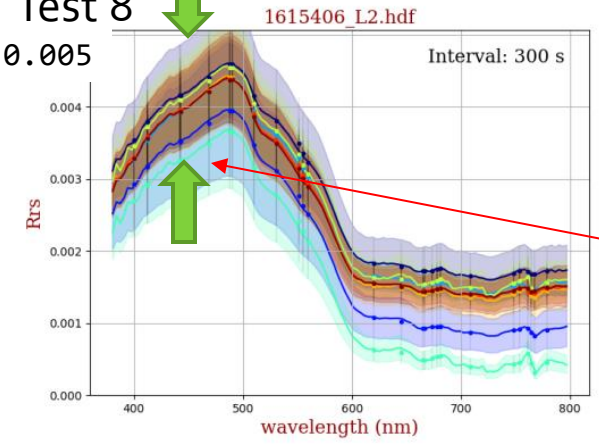


Test 7

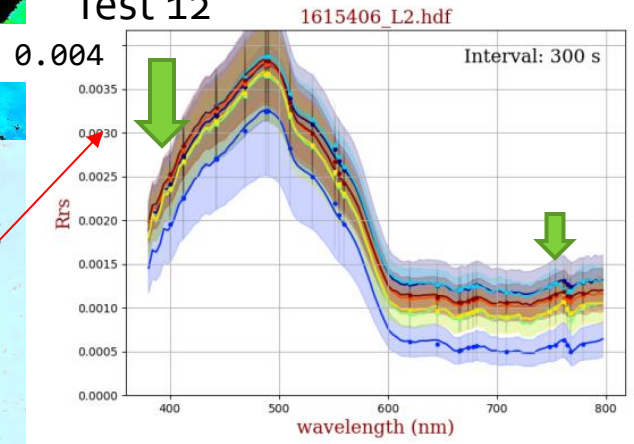


Aqua L3 bbt(645)

Test 8

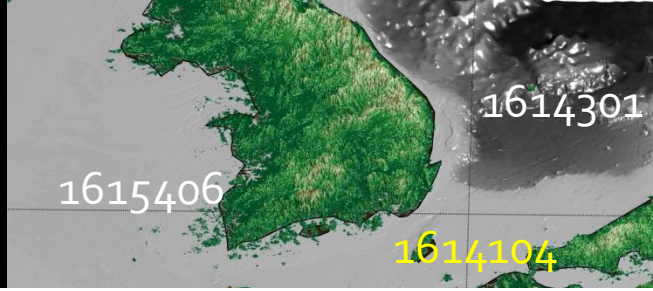


Test 12



1: No QC + 50% Lt + Mobley Glint
5: Basic QC + 50% Lt + Mobley Glint
7: Full QC + 10% Lt + Mobley Glint
8: Full QC + 10% Lt + Ruddick Glint
12: Full QC + 10% Lt + Zhang Glint
+ SimSpec NIR

Processing Improvements



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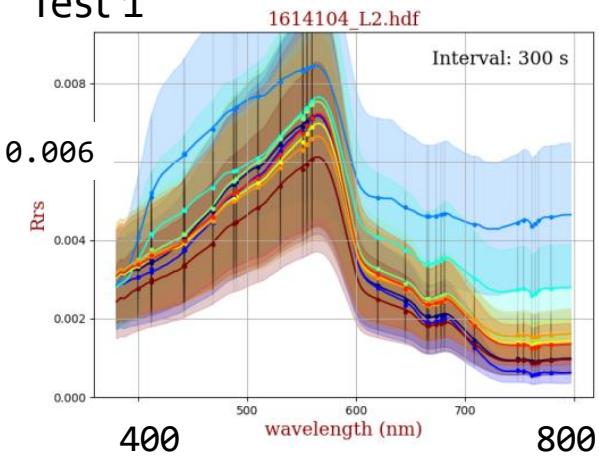

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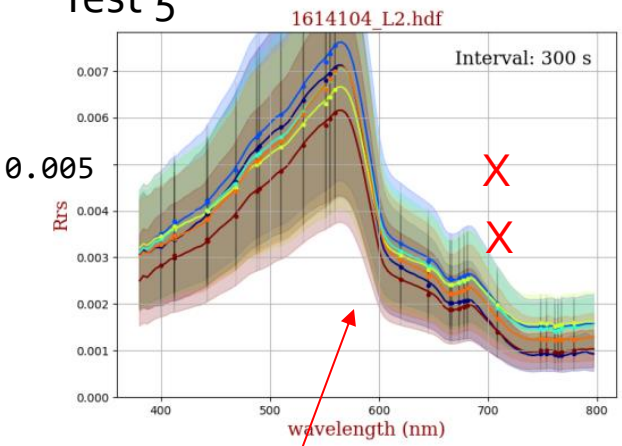

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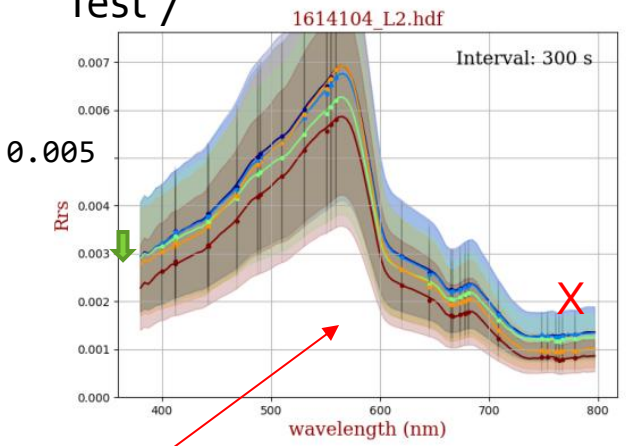

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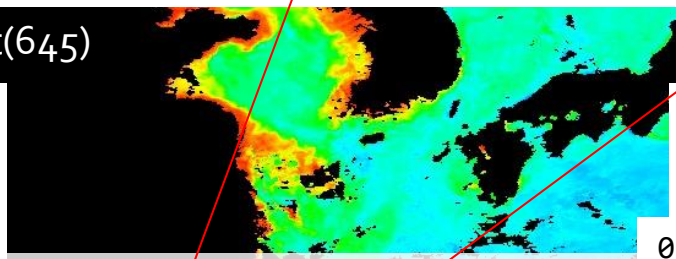

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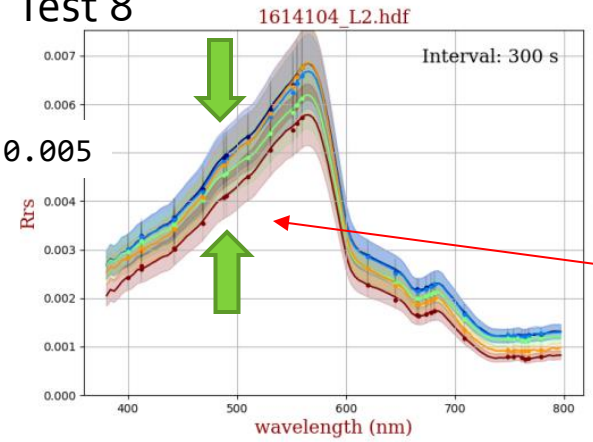

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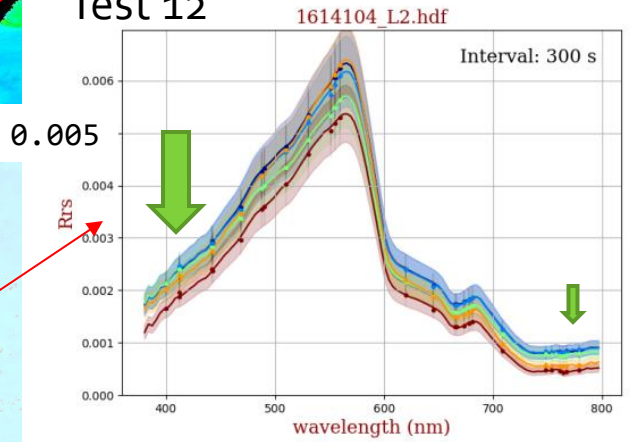

Entire Cruise

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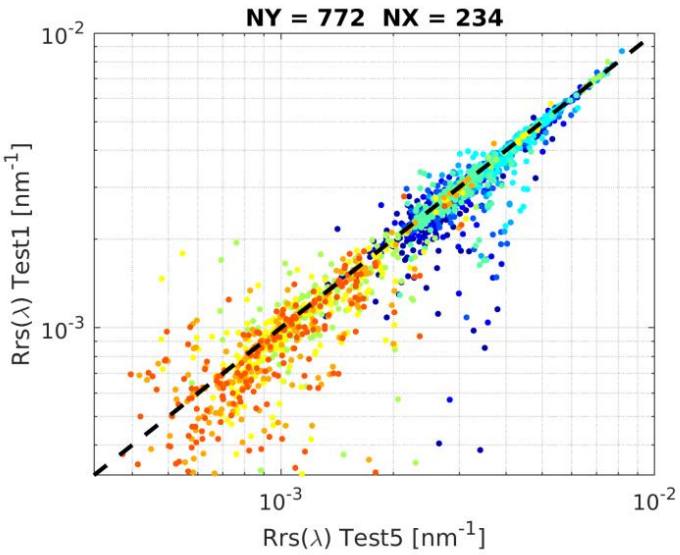
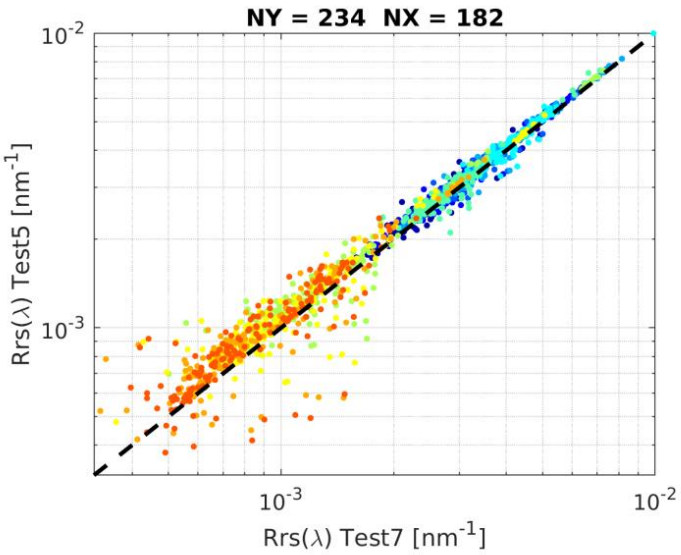
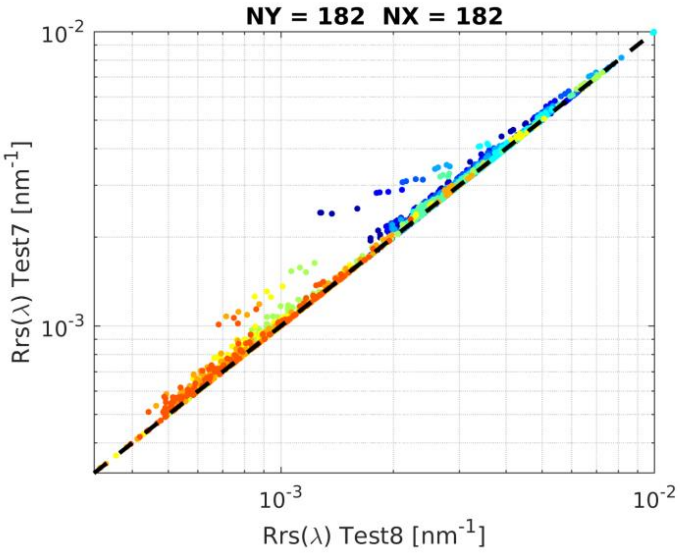
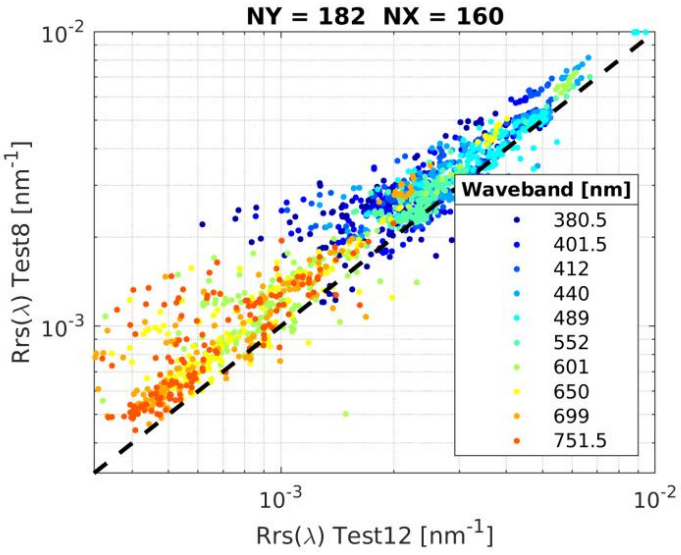


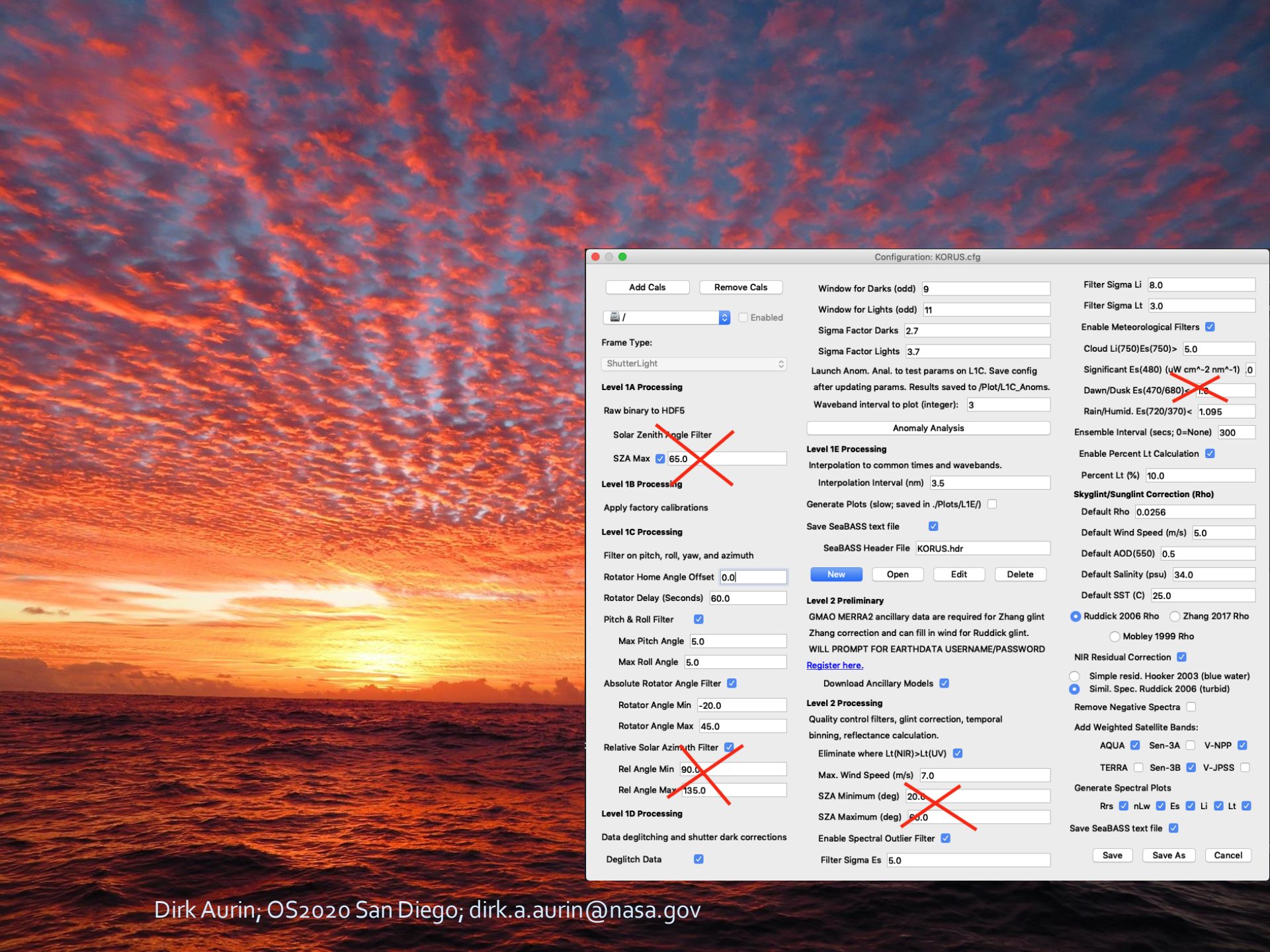






Summary

- Many challenges - Is underway data "quality"?
  - Collected under non-ideal conditions
  - HyperInSPACE adapts to conditions & filters using field info
  - Transparent, shareable, and traceable
  - Still need to validate; match to station in-water data
- Is HyperInSPACE ready?
  - We need beta testers. Contact me.
- What's next?
  - BRDF correction and uncertainty budgets need improvement (not just in HyperInSPACE)
  - Add in OC product retrievals (Kd, Chl, GIOPs, QAA, etc.)
  - Should grow to accommodate more instrument suites (DALEK, WISP, Trios, Hypernets, …?)



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